

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

1 (currently amended). A display device for selectively discharging a plurality of discharge cells to display an image, ~~characterized by~~ comprising:

a display panel that includes ~~including~~ said plurality of discharge cells;

a first driving circuit that applies ~~for applying~~ a driving pulse to a ~~the~~ selected discharge cell in said display panel to induce a first discharge; and

a second driving circuit that increases a ~~for increasing, after a voltage of the driving pulse is reduced by the first discharge, the voltage of the driving pulse, to induce a second discharge subsequently to said first discharge, after the voltage of said driving pulse is reduced by said first discharge, wherein an interval between a peak of said first discharge and a peak of said second discharge is not less than 100 ns nor more than 550 ns.~~

2 (original). The display device according to claim 1, characterized in that said second driving circuit induces said second discharge while a priming effect produced by said first

discharge is obtained.

3 and 4 (canceled).

5 (original). The display device according to claim 1, characterized in that the interval between the peak of said first discharge and the peak of said second discharge is not less than 300 ns nor more than 550 ns.

6 (original). The display device according to claim 1, characterized in that the peak intensity of said second discharge is not less than the peak intensity of said first discharge.

7 (original). The display device according to claim 1, characterized in that said plurality of discharge cells respectively include capacitive loads, and said first driving circuit comprises an inductance circuit having at least one inductance element having its one end connected to said capacitive load, and a resonance driving circuit for outputting said driving pulse due to LC resonance by said capacitive load and said inductance element.

8 (original). The display device according to claim 1, characterized in that said first driving circuit comprises a first capacitive element provided outside said display panel as a current supply source for said driving pulse, said first capacitive element recovering charges stored in said discharge cells.

9 (previously presented). The display device according to claim 1, characterized by further comprising a third driving circuit for increasing, after the voltage of the driving pulse is reduced by the second discharge, the voltage of the driving pulse, to induce third discharge subsequently to said second discharge.

10 (previously presented) The display device according to claim 9, characterized in that said third driving circuit repeats an operation for increasing, after the voltage of the driving pulse is reduced by the discharge, the voltage of the driving pulse, to continuously induce discharges a plurality of times subsequently to the second discharge.

11 (original). The display device according to claim 9, characterized in that said second driving circuit comprises
a second capacitive element provided outside said display panel as a current supply source for said driving pulse, and

a voltage source for charging said second capacitive element to a predetermined voltage.

12 (currently amended). The display device according to claim 1, characterized in that said driving pulse includes a driving pulse which makes a [[the]] transmission from a first potential to a second potential and takes a maximal value and a minimal value at least once during a [[the]] transition from the first potential to the second potential, and further comprising

a final driving circuit that drives ~~for driving~~ said driving pulse such that a [[the]] transition speed from a predetermined ~~the final~~ extreme value to the second potential is lower than a [[the]] transition from the first potential to an extreme value immediately after that and a [[the]] transition speed from a [[the]] subsequent extreme value to another [[an]] extreme value immediately after that.

13 (currently amended). The display device according to claim 12, wherein ~~characterized in that~~

said final driving circuit comprises;

a field effect transistor having [[its]] one end receiving said field potential, and

a current-limiting circuit for limiting a current of a control signal inputted to the gate

of said field effect transistor.

14 (currently amended). A display device for selectively discharging a plurality of discharge cells to display in image, ~~characterized by~~ comprising:

a display panel that includes ~~including~~ said plurality of discharge cells;

a driving circuit that applies ~~for applying~~ a driving pulse to ~~a the~~ selected discharge cell in said display panel to induce a second discharge after inducing a first discharge;

a detection circuit that detects a ~~for detecting the~~ lighting rate of ~~the~~ discharge cells ~~which are~~ simultaneously turned on out of said plurality of discharge cells; and

a control circuit that controls ~~for controlling~~ said driving circuit such that said driving pulse is changed depending on the lighting rate detected by said detection circuit.

15 (currently amended). The display device according to claim 14, ~~characterized by~~ further comprising:

a conversion circuit that converts ~~for converting~~, in order to divide one field into a plurality of sub-fields and discharge ~~a~~ ~~[[the]]~~ selected discharge cell for each sub-field to make ~~a~~ gray scale expression, image data in the one field into image data in each sub-field,

said detection circuit comprising a sub-field lighting rate detection circuit that detects ~~for detecting~~ the lighting rate for each sub field,

said control circuit controlling said driving circuit such that said driving pulse is changed depending on the lighting rate for each sub-field detected by said sub-field lighting rate detection circuit.

16 (currently amended). The display device according to claim 14, wherein
~~characterized in that~~

said driving circuit comprises;

a first driving circuit that increases ~~for increasing~~ the voltage of said driving pulse to induce said first discharge, and

a second driving circuit that increases ~~for increasing~~ the voltage of said driving pulse to induce said second discharge after inducing said first discharge, and

said control circuit controlling said second driving circuit such that said driving pulse is changed depending on the lighting rate detected by said detection circuit.

17 (previously presented). The display device according to claim 16, characterized in that said second driving circuit increases, after the voltage of said driving pulse is reduced by the first discharge, the voltage of the driving pulse, to induce said second discharge subsequently to the first discharge.

18 (currently amended). The display device according to claim 16, wherein ~~characterized in that~~ said control circuit changes a ~~a~~ [[the]] timing at which said second driving circuit increases the voltage of said driving pulse depending on the lighting rate detected by said detection circuit.

19 (currently amended). The display device according to claim 16, wherein a ~~characterized in that the~~ higher the lighting rate detected by said detecting circuit is, a ~~a~~ [[the]] later a ~~a~~ [[the]] timing at which said second driving circuit increases the voltage of said driving pulse is.

20 (original). The display device according to claim 16, characterized in that said control circuit controls, when the lighting rate detected by said detection circuit reaches not less than a predetermined value, said second driving circuit such that said second discharge is induced subsequently to said first discharge.

21 (currently amended). ~~presented).~~ The display device according to claim 16, wherein ~~characterized in that~~ said control circuit controls said second driving circuit so as to delay a ~~a~~ [[the]] timing at which the voltage of the driving pulse is increased with an ~~an~~ [[the]] increase in the lighting rate detected by said detection circuit, and advance the timing at

which the voltage of said driving pulse is increased to not less than the predetermined value.

22 (currently amended). The display device according to claim 16, wherein ~~characterized in that~~ said control circuit controls said second driving circuit so as to switch ~~a~~ a ~~[[the]]~~ timing at which the second driving circuit increases the voltage of the driving pulse when the lighting rate detected by said detection circuit reaches not less than a predetermined value and change ~~a~~ a ~~[[the]]~~ number of pulses composing the driving pulse applied to the selected discharge cell in the display panel such that ~~a~~ luminance is approximately equal before and after the switching of the timing at which the voltage of the driving pulse is increased.

23 (currently amended). The display device according to claim 14, wherein ~~characterized in~~ said control circuit controls said driving circuit such that ~~a~~ a ~~[[the]]~~ higher the lighting rate detected by said detecting circuit is, ~~a~~ a ~~[[the]]~~ longer ~~a~~ a ~~[[the]]~~ period of said driving pulse is.

24 (currently amended). The display device according to claim 14, wherein ~~characterized in that~~ said control circuit controls said driving circuit so as to switch ~~a~~ a ~~[[the]]~~ period of said driving pulse when the lighting rate detected by said detection circuit reaches

not less than a predetermined value and change a a ~~[[the]]~~ number of pulses composing the driving pulse applied to the selected discharge cell in said display panel such that a luminance is approximately equal before and after the switching of the period of said driving pulse.

25 (currently amended). The display device according to claim 15, wherein
~~characterized in that~~

said driving circuit applies, in the same sub-field, at least one of a first driving pulse for inducing a discharge once by applying one pulse and a second driving pulse for inducing said second discharge after inducing said first discharge, and

said control circuit controls said driving circuit so as to change a a ~~[[the]]~~ ratio of a a ~~[[the]]~~ number of times of application of said first driving pulse to a a ~~[[the]]~~ number of times of application of said second driving pulse depending on the lighting rate for each sub-field detected by said sub-field lighting rate detection circuit.

26 (currently amended). The display device according to claim 15, wherein
~~characterized in that~~

said driving circuit applies, in the same sub-field, at least one of a first driving pulse for inducing said first and second discharges at a first time interval and a second driving

pulse for inducing said first and second discharges at a second time interval longer than the first time interval, and

said control circuit controls said driving circuit so as to change a ~~a~~ [[the]] ratio of a [[the]] number of times of application of said first driving pulse to the number of times of application of said second driving pulse depending on the lighting rate for each sub-field detected by said sub-field lighting rate detection circuit.

27 (currently amended). The display device according to claim 26, wherein a ~~characterized in that~~ the period of said second driving pulse is longer than a ~~a~~ [[the]] period of said first driving pulse.

28 (currently amended). The display device according to claim 26, wherein ~~characterized in that~~ said control circuit controls said driving circuit such that a ~~a~~ [[the]] higher the lighting rate for each sub-field detected by said sub-field lighting rate detection circuit is, a ~~a~~ [[the]] higher the ratio of the number of times of application of said second driving pulse to the number of times of application of said first driving pulse becomes.

29 (original). The display device according to claim 26, characterized in that said control circuit controls said driving circuit so as to increase the ratio of the number of times

of application of said second driving pulse to the number of times of application of the second driving pulse to the number of times of application of the first driving pulse with the increase in the lighting rate when the lighting rate is increased to not less than a predetermined value.

30 (original). The display device according to claim 16, characterized in that said first driving circuit comprises a first capacitive element provided outside said display panel as a current supply source for said driving pulse.

31 (original). The display device according to claim 30, characterized in that said first capacitive element recovers charges stored in said discharge cell.

32 (currently amended). ~~A [[The]] display device according to claim 16, characterized in that~~ for selectively discharging a plurality of discharge cells to display in image, comprising:

a display panel that includes said plurality of discharge cells;

a driving circuit that applies a driving pulse to a selected discharge cell in said display panel to induce a second discharge after inducing a first discharge;

a detection circuit that detects a lighting rate of discharge cells simultaneously turned

on out of said plurality of discharge cells; and

a control circuit that controls said driving circuit such that said driving pulse is changed depending on the lighting rate detected by said detection circuit, wherein said plurality of discharge cells respectively include capacitive loads, and

said first driving circuit comprises:

an inductance circuit having at least one inductance element having ~~its one~~ a first end connected to said capacitive load, and

a resonance driving circuit that outputs ~~for outputting~~ said driving pulse due to LC resonance by said capacitive load and said inductance element.

33 (currently amended). The display device according to claim 32, wherein ~~characterized in that~~ said inductance circuit includes a variable inductance circuit capable of changing an inductance value, and further comprising

an inductance control circuit that changes ~~for changing~~ the inductance value of said variable inductance circuit depending on the lighting rate detected by said detection circuit.

34 (currently amended). The display device according to claim 16, wherein ~~characterized in that~~

said driving circuit further comprises a third driving circuit ~~for increasing~~ that

increases, after the voltage of said driving pulse is reduced by the second discharge, the voltage of said driving pulse, to induce a third discharge subsequently to said second discharge, and

said control circuit controls said third driving circuit such that said driving pulse is changed depending on the lighting rate detected by said detection circuit.

35 (previously presented). The display device according to claim 9, characterized in that

said third driving circuit repeats an operation for increasing the voltage of the driving pulse after the voltage of the driving pulse is reduced by the discharge, to continuously induce discharges a plurality of times subsequently to the second discharge, and

said control circuit controls said third driving circuit such that said driving pulse is changed depending on the lighting rate detected by said detection circuit.

36 (currently amended). ~~A [[The]] display device according to claim 34, characterized in that~~ for selectively discharging a plurality of discharge cells to display in image, comprising:

a display panel that includes said plurality of discharge cells;

a driving circuit that applies a driving pulse to a selected discharge cell in said display

panel to induce a second discharge after inducing a first discharge;

a detection circuit that detects a lighting rate of discharge cells simultaneously turned on out of said plurality of discharge cells; and

a control circuit that controls said driving circuit such that said driving pulse is changed depending on the lighting rate detected by said detection circuit, wherein said driving circuit comprises:

a first driving circuit that increases the voltage of said driving pulse to induce said first discharge; and

a second driving circuit that increases the voltage of said driving pulse to induce said second discharge, said second driving circuit comprises comprising:

a second capacitive element provided outside said display panel as a current supply source for said driving pulse, and

a voltage source that charges ~~for charging~~ said second capacitive element to a predetermined voltage.

37 (currently amended). The display device according to claim 36, wherein ~~characterized in that~~ said voltage source includes a variable voltage source that changes ~~capable of changing~~ its output voltage, and further comprising

a voltage control circuit that controls ~~for controlling~~ the output voltage of said variable

voltage source such that a ~~[[the]]~~ higher the lighting rate detected by said detection circuit is, a ~~[[the]]~~ lower a charging voltage for said second capacitive element becomes.

38 (currently amended). The display device according to claim 36, wherein ~~characterized in that~~ said voltage source includes a variable voltage source that changes ~~capable of changing~~ its output voltage, and further comprising

a potential detection circuit that detects ~~for detecting~~ a potential of said driving pulse ~~which is~~ changed by said first discharge, and

a voltage control circuit that controls ~~for controlling~~ an output voltage of said variable voltage source such that a ~~[[the]]~~ larger an ~~[[the]]~~ amount of change in the potential detected by said potential detection circuit is, a ~~[[the]]~~ lower a ~~[[the]]~~ charging voltage for said second capacitive element becomes.

39 (currently amended). A method of selectively discharging a plurality of discharge cells to display an image, ~~characterized by comprising the steps of:~~

applying a driving pulse to a ~~[[the]]~~ selected discharge cell to induce a first discharge;
and

increasing, after a voltage of the ~~[[said]]~~ driving pulse is reduced by the first discharge, the voltage of the driving pulse, to induce a second discharge subsequently to the

first discharge, wherein an interval between a peak of the first discharge and a peak of the second discharge is not less than 100 ns nor more than 550 ns.

40 (currently amended). The method of driving a display device according to claim 39, ~~characterized by further comprising the step of :~~

increasing, after the voltage of said driving pulse is reduced by the second discharge, the voltage of the driving pulse, to induce a third discharge subsequently to the second discharge.

41 (currently amended). The method of driving a display device according to claim 40, ~~wherein characterized in that the step of inducing the~~ the ~~[[said]]~~ third discharge further comprises ~~the step of~~ repeating an operation for increasing, after the voltage of ~~the~~ the ~~[[said]]~~ driving pulse is reduced by the discharge, the voltage of the driving pulse, to continuously induce discharges a plurality of times subsequently to the second discharge.

42 (original). The method of driving a display device according to claim 39, characterized in that said driving pulse includes a driving pulse which makes ~~a~~ a ~~[[the]]~~ transition from a first potential to a second potential and takes a maximal value and a minimal value at least once during ~~a~~ a ~~[[the]]~~ transition from the first potential to the second

potential, and further comprising ~~the step of~~

driving ~~the said~~ driving pulse such that ~~a~~ [[the]] transition speed from ~~a predetermined~~ ~~the final~~ extreme value to the second potential is lower than ~~a~~ [[the]] transition speed from the first potential to an extreme value immediately after that and ~~a~~ [[the]] transition speed from ~~a~~ [[the]] subsequent extreme value to ~~another~~ [[an]] extreme value immediately after that.

43 (currently amended). A method of selectively discharging a plurality of discharge cells to display an image, ~~characterized by comprising the steps of:~~

detecting ~~a the~~ lighting rate of ~~the~~ discharge cells which are simultaneously turned on out of said plurality of discharge cells; and

changing ~~a said~~ driving pulse depending on the detected lighting rate detected by ~~said detecting step~~ to apply the driving pulse to ~~a the~~ selected discharge cell, and inducing a second discharge after inducing a first discharge.

44 (currently amended). The method of driving a display device according to claim 43, wherein ~~characterized in that~~

~~the step of inducing the~~ [[said]] first and second discharges comprises ~~the steps of :~~
increasing the voltage of the driving pulse applied to the selected discharge cell, to

induce the first discharge, and

increasing the voltage of the [[said]] driving pulse to induce the [[said]] second discharge after inducing the [[said]] first discharge, and changing the [[said]] driving pulse ~~depending on the~~ in accordance with the detected lighting rate ~~detected by the said detecting step.~~

45 (previously presented). The method of driving a display device according to claim 44, ~~wherein characterized in that the step of inducing the~~ [[said]] second discharge comprises ~~the step of increasing, after the voltage of the~~ [[said]] driving pulse is reduced by the first discharge, the voltage of the driving pulse, to induce the second discharge subsequently to the first discharge, and changing the timing at which the voltage of the [[said]] driving pulse is increased in accordance with the detected ~~depending on the~~ lighting rate ~~detected by said detecting step.~~

46 (new). A display device for selectively discharging a plurality of discharge cells to display an image, comprising:

a display panel that includes said plurality of discharge cells;

a first driving circuit that applies a driving pulse to a selected discharge cell in said display panel to induce a first discharge; and

a second driving circuit that increases a voltage of the driving pulse, to induce a second discharge subsequently to said first discharge, wherein said plurality of discharge cells respectively include capacitive loads, and said first driving circuit comprises an inductance circuit that has at least one inductance element having a first end connected to a capacitive load, and a resonance driving circuit that drives said driving pulse due to LC resonance by said capacitive load and said inductance element.

47 (new). A display device for selectively discharging a plurality of discharge cells to display an image, comprising:

a display panel that includes said plurality of discharge cells;
a first driving circuit that applies a driving pulse to a selected discharge cell in said display panel to induce a first discharge; and

a second driving circuit that increases a voltage of the driving pulse, to induce a second discharge subsequently to said first discharge, wherein said first driving circuit comprises a first capacitive element provided outside said display panel as a current supply source for said driving pulse, said first capacitive element recovering charges stored in said discharge cells.

48 (new). A display device for selectively discharging a plurality of discharge cells

to display an image, comprising:

a display panel that includes said plurality of discharge cells;

a first driving circuit that applies a driving pulse to a selected discharge cell in said display panel to induce a first discharge; and

a second driving circuit that increases a voltage of the driving pulse, to induce a second discharge subsequently to said first discharge, wherein said second driving circuit comprises a second capacitive element provided outside said display panel as a current supply source for said driving pulse, and a voltage source charges said second capacitive element to a predetermined voltage.